



Model: TOO

Automatic Separation Valve

The ECO model TOO is a specific gravity sensitive valve, for the automatic draining of a heavier fluid from a lighter fluid.

Commonly used for the draining of water accumulated in the bottom of petroleum product storage tanks where the stored medium has a lower specific gravity than that of the accumulated water. The TOO valve should be opened to initiate dewatering.

When all the accumulated water has drained from the storage tank the presence of product will be sensed by the TOO valve and it will automatically and immediately shut off drip tight. When fitted with the optional factory limit switch, a signal sent to a remote valve position monitoring system, signaling that the valve is closed. It is well suited for use with storage tanks containing Gasoline, Gas Oil, Jet Fuel, Kerosene, Diesel Oil, Crude Oil and all Petroleum products including Light Crude Oil. The TOO uses a simple and reliable principle with a straightforward and compact construction, designed to require minimal maintenance, and to last the lifetime of the tank.

Using the TOO can save product loss, work hours, and increase available tank storage space. It is environmentally cleaner, safer, more reliable and efficient compared to manual or other methods

Each valve is assembled and tested in the ECO ISO 9001 certified manufacturing plant. Introduced to the industry years ago, the TOO is a time proven product in use in over 20 countries worldwide and backed by the Global Service Network of E C O - VALVES LTD.



Features and Benefits

Safety

- Reduced technicians exposure to harmful product fumes
- Eliminates product spillage during dewatering
- Integral strainer for reliable sealing

High Performance

- Immediate closing response when product detected
- High accuracy / repeatability
- High drain flow efficiency
- Built in Anti Vortex Device, for efficient controlled flow

Cost Effective

- Very low maintenance
- No external power supply needed
- Increases available product storage space
- Saves Labour
- Greatly reduces the plants total water treatment volume

Factory Fitted Options

- Limit Switch: ATEX or Nema -Certified For hazardous areas
- Manual Pump: for above tank bottom installations
- Outlet Valve Handle Extension: for pit installations
- Visual Valve Position Indicator

Cover

Vent/Sampling Valve

Inlet

Float Guide/Strainer

Valve Float

Equalizing

Seal

Limit Switch

Outlet Valve





Model: TOO

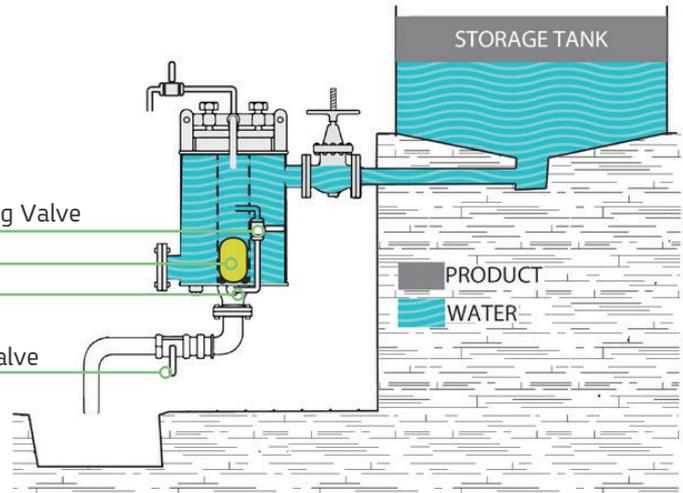
Principle of Operation

Normal Operation (before dewatering)

Water that accumulates in the bottom of the storage tank reaches the TOO valve.

At this stage the float (2) is pressed, by the water pressure above it, against the seal at bottom of the valve sealing drip tight.

- (1) Equalizing Valve
- (2) Float
- (3) Seal
- (4) Outlet Valve



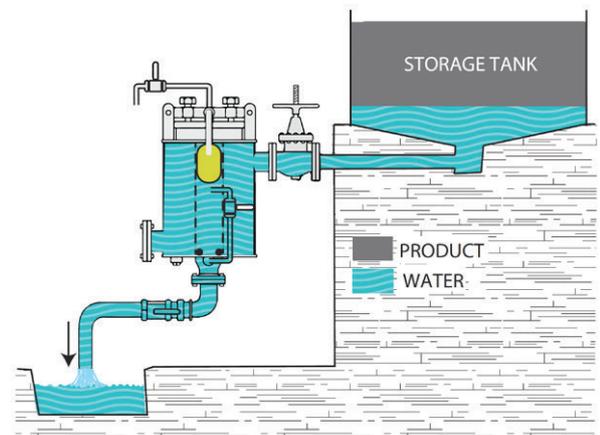
Dewatering

Dewatering is initiated by momentarily opening the pressure equalizing valve (1) if water is present, the float will rise thus opening the outlet seal (3).

The outlet valve (4) should now be opened to allow free flow of the accumulated water to the drainage system.

During drainage the Integral Strainer will help to keep the TOO seal clear of the debris often experienced in the bottom of storage tanks, ensuring a reliable seal at the end of the dewatering session.

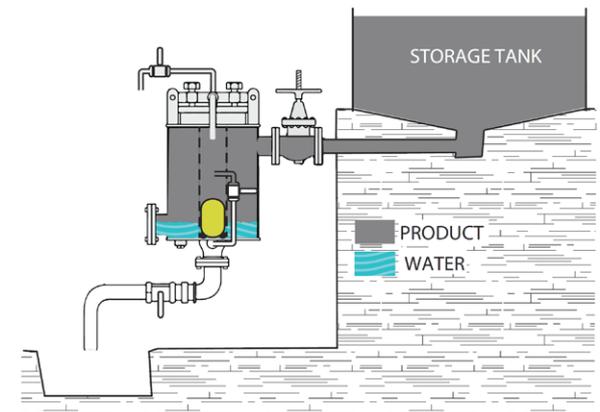
The built in Anti Vortex Device will control the flow, preventing the formation of a Vortex within the storage tank mixing the natural phase between the product and the accumulated water.



Normal Operation

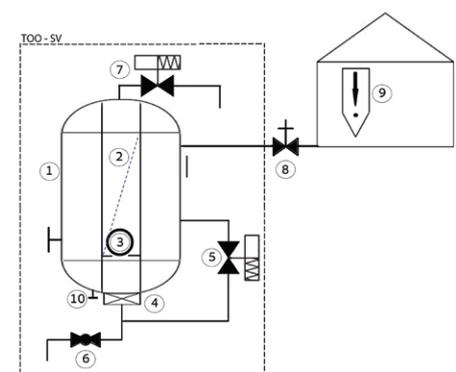
When the water has completely drained and product enters the TOO valve, the float (2) quickly descends in the lighter medium and seals the valve.

After closing, the float remains hydraulically pressed against the seat, sealing the outlet. The TOO should be reset by closing the outlet valve (4) until the next dewatering session. Remaining product in the TOO will "float" back to the tank.



System P&ID

- | | |
|---|-------------------------------------|
| 1. Separating valve body | 6. Outlet ball valve |
| 2. Strainer/float guide | 7. Venting/sampling valve |
| 3. Balanced float | 8. Storage tank drain valve |
| 4. Vortex inhibitor | 9. Storage tank /gravity separation |
| 5. Equalizing valve (spring return N.C) | 10. Sump plug |





Typical Installation and Maintenance

It is recommended, where possible, to install the ECO TOO dewatering separation valve at or below the lowest point of the storage tank (see Fig1). This ensures that any residual product remaining in the ECO TOO valve after a dewatering session, will “float” back up into the storage tank as accumulated heavier water enters the TOO. In installations where the TOO valve can only be installed at a point higher than the lowest point of the storage tank (see Fig 2) a factory fitted manual pump is available to return in a clean and efficient manner any residual product left inside the TOO valve after dewatering, back to the tank or into a collecting vessel.

To enable the vortex inhibitor to perform correctly and prevent the formation of a vortex spout within the storage tank, there should be an air gap between the outlet and the drain (see Fig1).

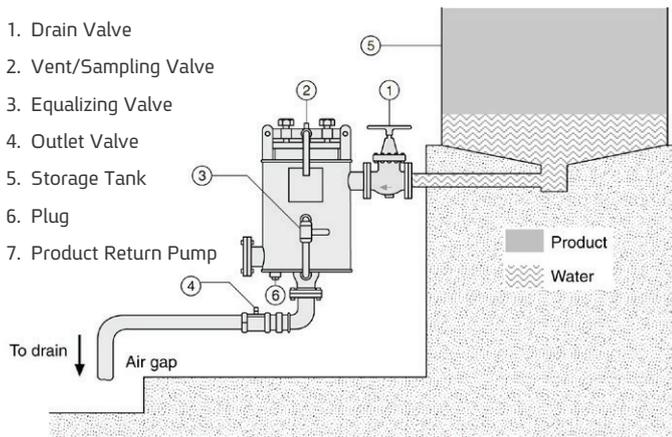


Fig 1: Installation at the lowest point of the tank

This air gap serves as a suction breaker, and keeps the outlet flow stable. The flow or outlet capacity of the TOO is also determined by the inlet head before the TOO valve - see the Flow Chart on page 4.

The compact and lightweight construction of the TOO facilitates a trouble-free attachment of the device, usually directly onto existing outlet pipes or flanges. Opening the ECO TOO valve for periodical maintenance and access to all internal parts is accomplished by simply removing the fast releasing cover.

The ECO TOO is designed for easy upkeep. It has a lightweight and compact, yet robust construction with only one moving part and with all internal parts being manufactured in appropriate grade stainless steel.

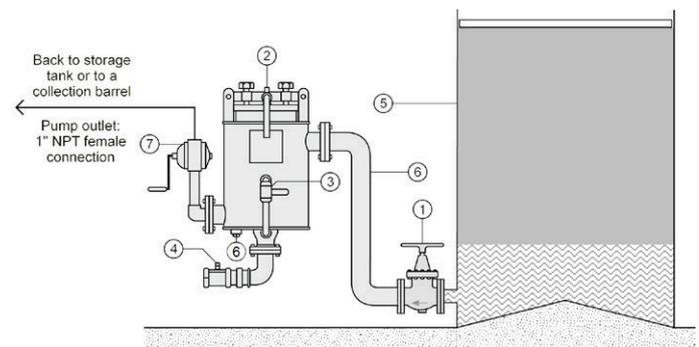


Fig 2: Installation higher than the lowest point of the tank

Engineering Specifications

The Automatic Draining Valve shall be made of a fusion bonded epoxy coated carbon steel body and will include an integral stainless-steel Strainer. The valve shall be equipped with a built-in device for the prevention of a vortex development within the storage tank during draining.

Installation shall not require any incursion or penetration of the storage tank. The Automatic Drain Valve shall include a factory fitted limit switch, properly certified for hazardous sites classifications. All external piping, fittings, bolting and all metallic internal parts shall be made of stainless steel. No additional parts shall be required for resetting. Removing the valve cover for inspection or maintenance shall be in line and shall not require removal of the valve from the pipeline. The Automatic Drain Valve shall be assembled and hydraulically tested by a factory certified to ISO 9001-2015.



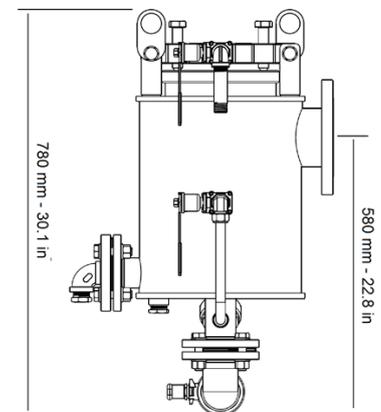
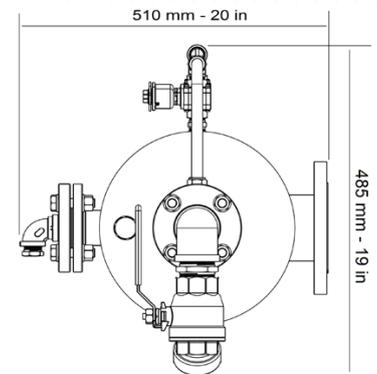
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Technical Specifications

Part	Material
Valve Body and Cover	Epoxy Coated Carbon Steel
Internal Parts	Stainless Steel
Seals	NBR or FKM
Ball Valves	Stainless Steel AISI 316
Bolts	Valves Stainless Steel AISI 316
Plugs	Stainless Steel AISI 303
Coating	Fusion Bonded Epoxy: RAL 5017
Inlet Connection*	4" ANSI #150 RF B16.5
Drain Connection	Threaded NPT/BSPT
Limit Switch	Stainless Steel – Certified for Hazardous Locations
Max. Working Pressure	2.5 bar / 36 psi
Approx. Weight	64 kg / 141 lb

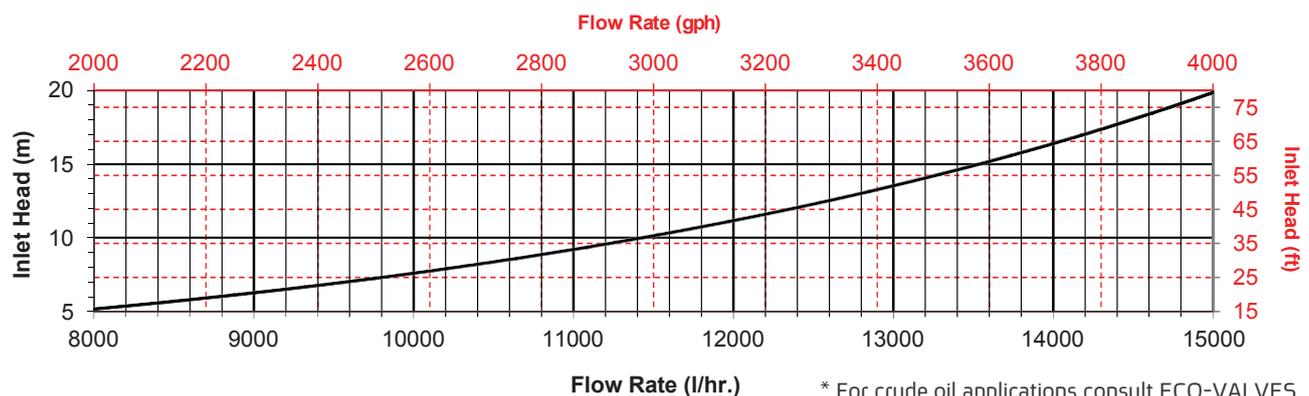
*Other connections available – contact ECO-VALVES

Dimensions



610T_9_13

Flow Chart



Ordering Code Designations

Type	Size	Connection	Options
TOO	4"	A5	S9A/S9N/M/C/P/I/
		ANSI#150 - A5	A5 Limit Switch (Atex) - S9A
			Limit Switch (NEMA) - S9N
			Outlet Valve Handle Extension - M
			Crude Oil Compatible - C
			Manual Return Pump - P
			Visual Indicator - I

**ECO-VALVES**

Ecological Draining Solutions



Separation Valve

Type: T00

- Installation
- Operation
- Maintenance

Separation valves – TOO

Installation, Operation, Maintenance

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Safety First

Eco-Valves believes that the safety of personnel working with and around our equipment is the most important consideration. Please read all safety information below, as well as from any other relevant source, before attempting to perform any maintenance function. Be sure to comply with all approved and established precautions for working with your type of equipment and/or environment. All maintenance tasks should be performed by authorized personnel.

Before attempting to perform any maintenance or operational procedures, carefully read all instructions to the end and make sure they are understood. If there is anything that is not clear, ask the appropriate authority. When performing any procedure, be sure to follow all the steps as indicated in the instructions, in the proper sequence and without omission.

Important:

1. In areas where freezing condition may occur, may occur a heating device for the separation valve and exposed piping is essential.
2. If the stored product has a high viscosity (heavy oil, crude oil etc.) it should be heated, the contents of the TOO separation valve should also be heated using a heating jacket or similar (not provided by Eco-Valves).



Separation valves – TOO

Installation, Operation, Maintenance

1.1 Installation

1.1.1 Description The ECO model TOO is a specific gravity sensitive valve, for the automatic draining of a heavier fluid from a lighter fluid. Commonly used for the draining of water accumulated in the bottom of petroleum product storage tanks where the stored medium has a lower specific gravity than that of the accumulated water.

1.1.2 Basic Installation **For all installations, be sure to install the Separation Valve:**

- In the vertical position (to be performed using a level measuring device to ensure accuracy)
- At the lowest available point of the storage tank
- Firmly positioned and held securely as close to the storage tank manual drain valve as possible before
- Ensure that the size of the Manual Drain Valve (1) between the storage tank and the Separation Valve is at least as large as the inlet of the Separation Valve. If a pipe is to be connected to the outlet of the Separation Valve, make sure it is as short, straight and horizontal as possible. This will allow undisturbed drainage and will prevent the development of undesirable suction. In cases where a downward slope is unavoidable, allow for an air gap (suction breaker) in the drainage pipeline, as in Figure 2. Make sure that the TOO valve and ancillary parts are thoroughly secured.

1.1.3 Typical Installations **There are several kinds of storage tanks, differing in basic design. Two design features that influence the positioning of the Separation Valve are:**

- Position shape of the storage tank floor
- Location of the storage tank drainage relative to ground level

Customer preferences may also influence the positioning of the Separation Valve.

1.1.3.0. Installing BELOW

Tank Bottom Level In below Tank Bottom installations as shown in figures 1 and 2, the Separation Valve is placed below the level of the storage tank bottom. The inlet to the Separation Valve is on the same level as the storage tank's draining outlet. In below Tank Bottom installations, there is a naturally occurring exchange of fluids between the Separation Valve and the storage tank. The water coming from the storage tank fills up the Separation Valve. The trapped product from the previous draining cycle, since it is lighter than water, returns to the storage tank by floating back up through the open Drain Valve (1).

Figure 1:
Below bottom - cone floor tank

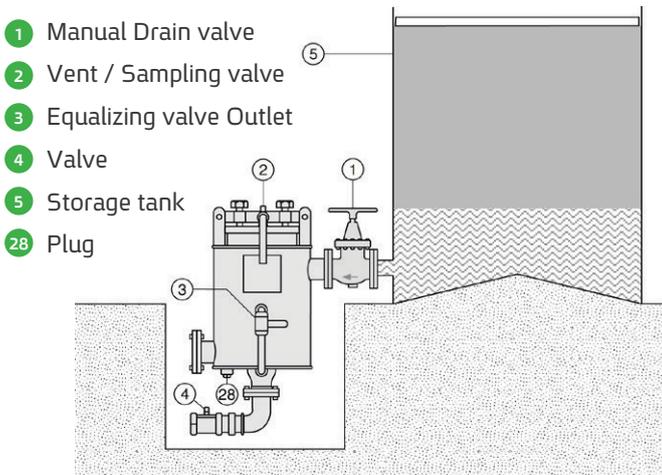
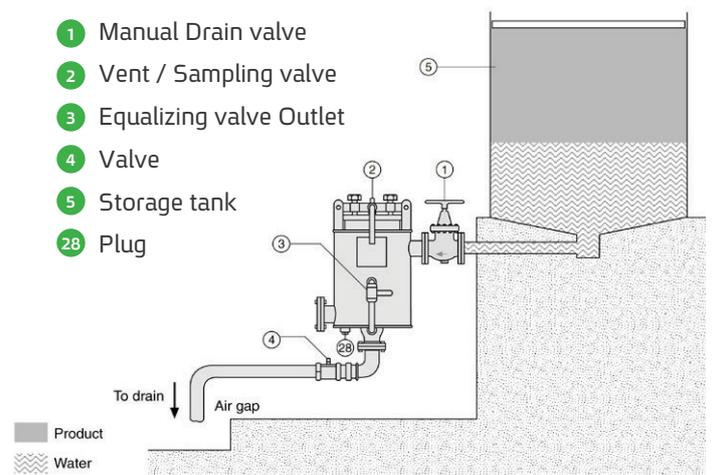


Figure 2:
Below bottom - central sump



1.1.3.1. Installing ABOVE

Tank Bottom Level In the ABOVE Tank Bottom installations described in figure 3 and 4, the Separation Valve is situated ABOVE the level of the storage tank bottom. The Adapter (6) connecting the Separation Valve and the storage tank is always full of liquid and the trapped product cannot return naturally to the storage tank, but must be transferred through operator intervention, by using a manual pump (7) or by draining the content to drain.

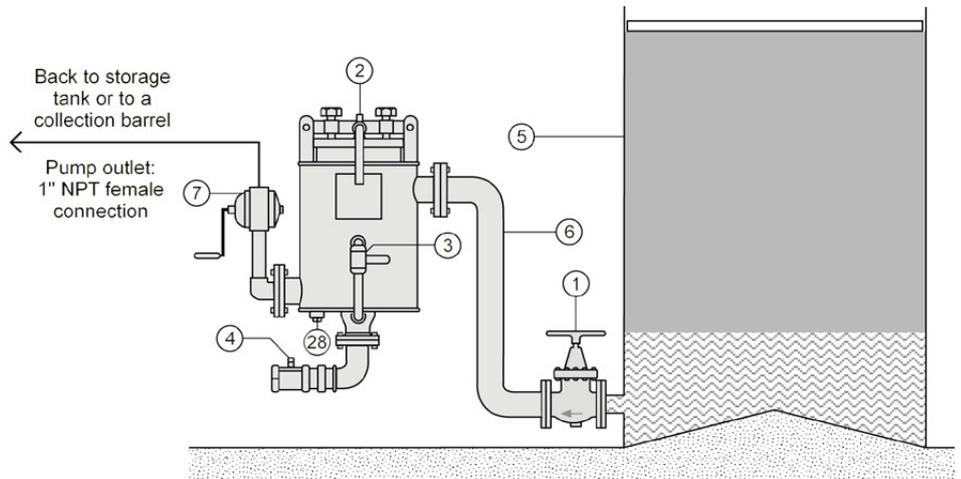
Note: Transfer/drain of the trapped product must be performed at the beginning of the next draining cycle. Using a safe means of product transfer helps ensure effective and safe drainage and helps prevent environmental pollution and loss of product.

1.1.4. Manual Pump

Operation The Manual Pump enables the transfer of trapped product back to the storage tank or collecting vessel. Since the discharge rate of a manual pump is approximately 1 liter per rotation, product trapped in both the Separation Valve and in the adapter is very quickly pumped out.

Figure 3: Above bottom

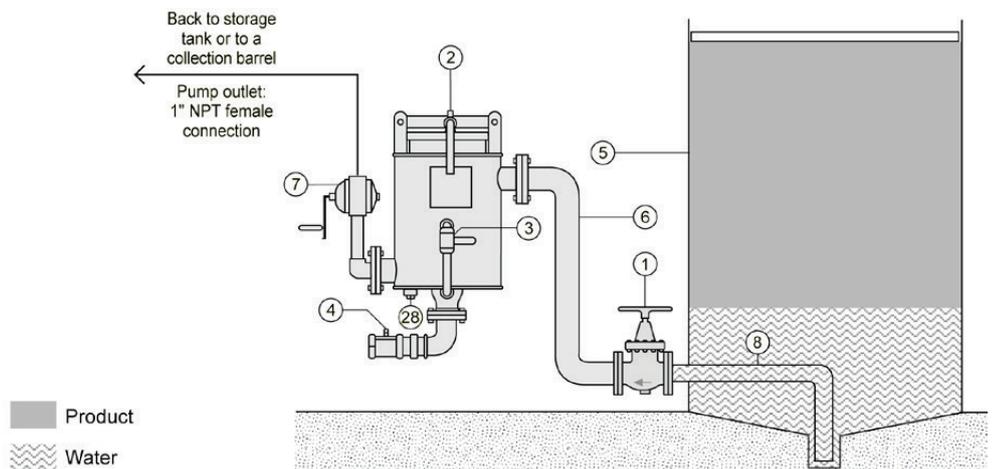
- 1 Drain valve
- 2 Vent / Sampling valve
- 3 Equalizing valve
- 4 Outlet Valve
- 5 Storage tank
- 6 Adapter
- 7 Manual pump
- 28 Plug



Note: To calculate the number of rotations required on a manual pump, determine the quantity of petroleum product remaining in the drainpipe (8) and adapter, and add it to the 20 liters (5.3 gal.) of product trapped in the Separation Valve. Verify by trial and error.

Figure 4: Above bottom - central sump

- 1 Drain valve
- 2 Vent / Sampling valve
- 3 Equalizing valve
- 4 Outlet Valve
- 5 Storage tank
- 6 Adapter
- 7 Manual pump
- 8 Drain pipe
- 28 Plug





Model: TOO

2. Operation

2.1. General The ability of the Separation Valve to drain water without draining product is based on the principle of two liquids being separated by their naturally occurring interface. For this reason it is necessary to allow approximately 3 hours (depending on the relative specific gravity of the product) of static still conditions inside the storage tank to elapse before draining.

Warning: Do not drain water from the storage tank during high-flow or filling, discharge or circulation, or within approximately 3 hours after such activity. Failure to comply with this warning may cause draining of product mixed with the water.

Flow rate while draining is approximately 13600 l/h (3600 gal/h) with a 13 meter (43 ft) product head (see chart). Prior to beginning the draining procedure, determine which instructions are relevant to you by carefully examining figures 1-4 and choosing the one most similar to your configuration.

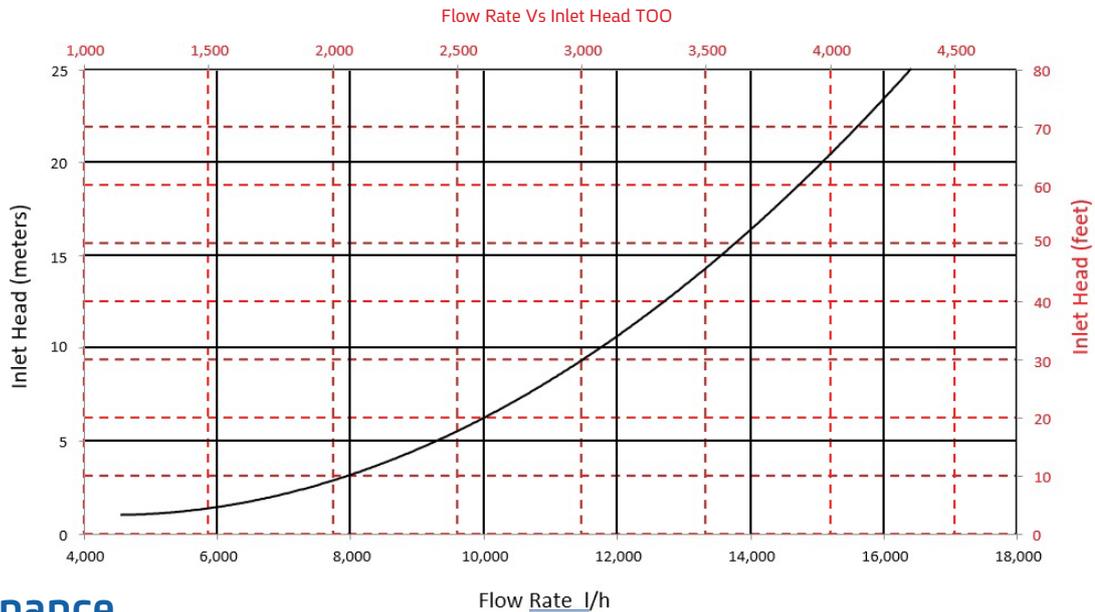
- 2.2. Draining** 1. Determine the approximate time required for the current draining cycle:
- a. Verify with the Control Room the quantity of water to be drained.
 - b. Verify the level of product in the storage tank.
 - c. With the aid of the flow chart, calculate the approximate draining time.
2. Fully open the Manual Drain Valve (1) at the inlet of the Separation Valve.

Note: The next step – Step 3 – applies only to ABOVE Tank Bottom installations as illustrated in figures 3 or 4, and if your installation is below Tank Bottom as illustrated in Figures 1 or 2, skip to Step 4.

1. For ABOVE Tank Bottom installations only: Transfer the trapped product back to the storage tank, to drain or to a collecting vessel.
2. Release air through the vent/sampling valve (2).
3. Momentarily open the Equalizing Valve (3), allowing the pressure surrounding the Separation Valve Float
4. (Figure 6, Item 6) to equalize. The Float will then come to rest on top of the heavier liquid.
5. Open the Outlet Valve (4). The water will begin to drain. When the approximated required time for draining has elapsed, inspect the Separation Valve. If draining has been completed, close the Outlet Valve (4). The Separation Valve is now ready for the next draining cycle.



Figure 5



3. Maintenance

- 3.1. General** The Separation Valve should be periodically inspected and cleaned. The frequency of internal inspection and cleaning depends on the condition of the storage tank and the purity of the product that is stored.
- In cases where the Separation Valve is installed onto an older storage tank (with more corrosion), or in cases where sludge and sediment are present, it is recommended to inspect and clean more frequently.
- In new petroleum tanks, it is recommended to conduct an internal check every 6 months. In older petroleum tanks, it is recommended to conduct an internal check every 3 months. Precise intervals for internal checks will be determined by the condition of the tank and quantity of sedimentation found in the Separation Valve. It is recommended to conduct the first inspection after three months of use.

Important: The float (Figure 6 Item 6 or 6A) can be calibrated by adding or subtracting water from the float. The float should float on water up to the beam and sink into the product intended for use (Gasoline, Diesel etc.). At the end of calibration, seal and tighten the plug of the float using the elastomeric seal and fuel resistant locking adhesive. Consult factory or distributor before performing this calibration.

3.2. Preparing for Disassembly

See figure 6

Warning: Be sure to depressurize the Separation Valve before opening Cover (8). Failure to do so may cause personal injury and product loss.

1. Close the Drain Valve (22).
2. Open Vent/Sampling Valve (21), remove Drain Plug (28) and drain the contents of the Separation Valve.

3.3. Disassembling

1. Release Bolts (11).
2. Release and remove Bolt (33) and Nut (12).
3. Lift Beam (9) and remove Cover (8).
4. Remove Guide (5) and Float (6).
5. Clean sediment and sludge from bottom of the Separation Valve.
6. Check integrity of the Seals (Figure 7, Items 2 and 7). Replace if necessary.



3.4. Reassembling See Figures 6 and 7.

1. Place the Float (6 or 6A) on the Seat.
2. Place the Guide (5) around the Float and center it on the Seat.
3. Replace the Cover (8), centered on the Guide (5). Ensure that the Cover O-ring (7 Fig.7) is positioned against the Separation Valve neck (Figure 7, Detail C).
4. Replace the Beam (9), Bolt (33) and Nut (12).(see Fig.6)
5. Tighten the Bolts (11) to ensure a good seal between the Cover (8) and the Separation Valve neck
6. Open the storage tank Drain Valve (Figures 1) and fill th separation valve till liquid flows from Ball Valve 21
7. Close valve Ball Valve 21 and examine for leaks.
8. Close Manual Drain Valve (1) see Fig. 3.

Item List for Figure 6

- 5 Guide
- 6 Float
- 6A Float (limit switch compatible)
- 8 Cover
- 9 Beam
- 12 Nut
- 11 Bolt
- 16 Equalizing Valve
- 21 Ball Valve
- 22 Ball Valve
- 28 Plug
- 33 Bolt

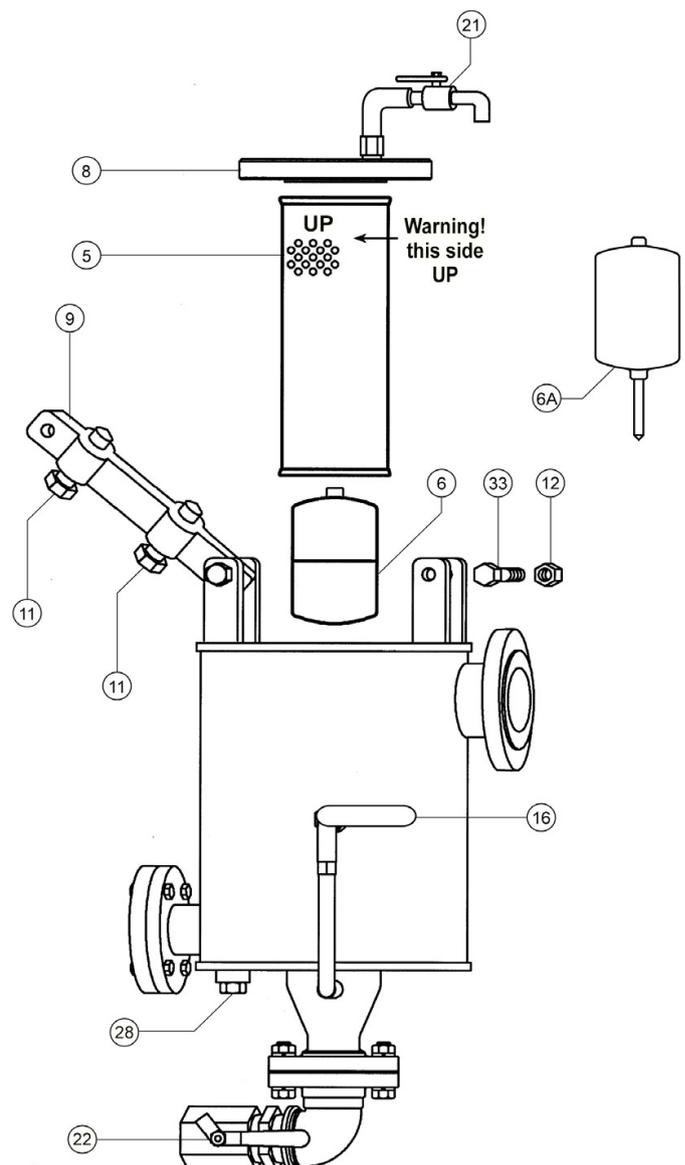
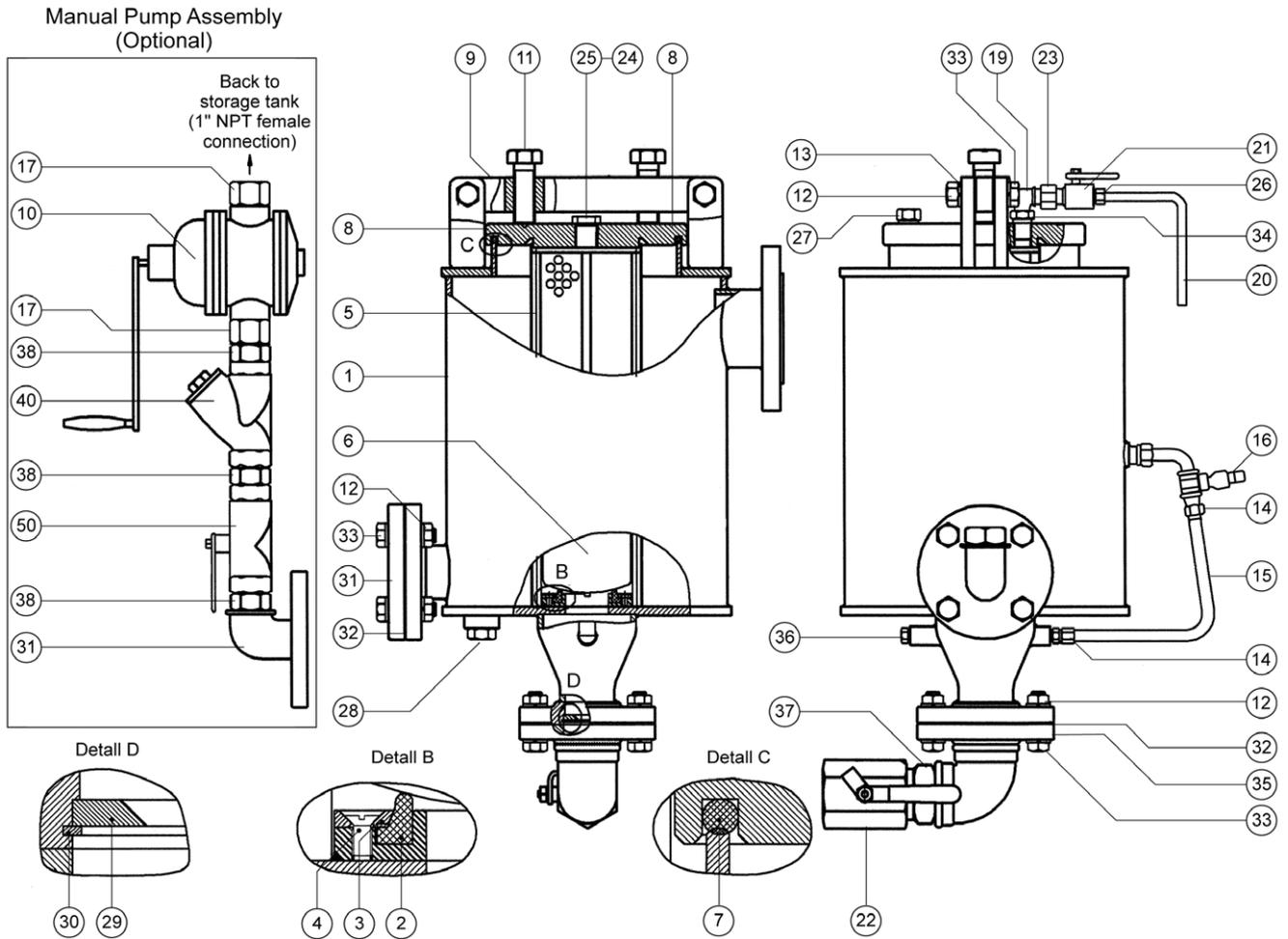
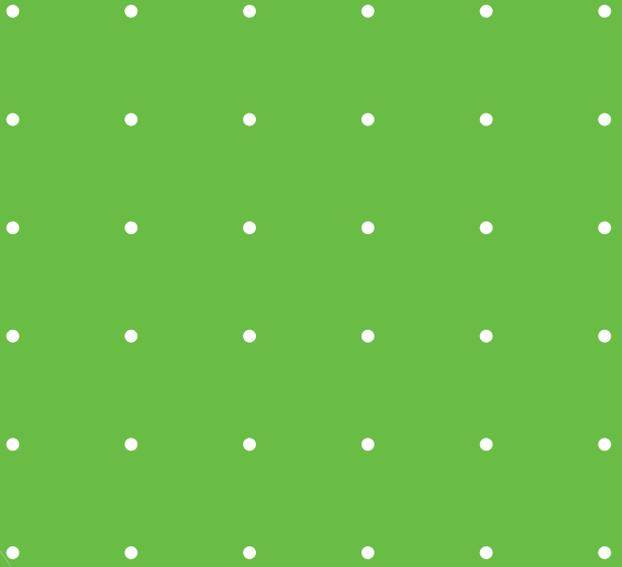


Figure 7





Product

Water



ECO-VALVES
Ecological Draining Solutions



ECO Valves- Standard International Limited Warranty

ECO Valves LTD. ("ECO") warrants that, for a period of 12 months from the day of delivery of the product by ECO to its customer (the "Warranty Period"), each component of the product shall be free from defects in material or workmanship and shall meet, in all material respects, the products technical specifications as defined by ECO.

General Conditions

This warranty shall be valid only if the product is installed, handled and maintained in accordance with ECO's written or verbal instructions and/or recommendations, if such has been provided.

This Warranty does not cover defects or damages resulting from accident, inappropriate physical or operational environment, failure of electrical power, improper installation, maintenance, service, repair, transportation, storage, modification, operation, use, negligence or fault by any party other than ECO.

This Warranty shall run solely to and in favor of the customer that purchased the defective product directly from ECO, and it does not extend to any other purchaser or user of the product.

Claims, Notifications and Compensation

Every warranty claim must be notified in writing to ECO as soon as reasonably possible after the discovery of the defective product, enclosing the original sales receipt and this warranty.

The claimant must allow ECO to inspect the product involved and the installation site itself, while the product is still in its original position and has not been removed or altered in any way, and/or return the product to ECO for testing. ECO reserves the right to investigate independently the cause of any failure.

If a claim under this Warranty is properly notified within the Warranty Period and found to be justified by ECO, then ECO, at its sole option, shall: (i) replace such product; or (ii) repair such product; or (iii) repay to the ECO customer any amounts actually paid to ECO for such product.

In any way, ECO's liability shall not exceed the amounts actually paid by the ECO customer to ECO for the defective products.

Limitations

This Warranty is the sole warranty in respect to the products.

Under no circumstances shall ECO be liable for any indirect, special or consequential damages, and including, without limitation, for any loss of profit, loss in connection with business interruption, loss of use, loss of revenues or damage to business or reputation.

This warranty does not cover any costs and expenses of removal and installation of the product or shipping cost or taxes or any other direct or indirect loss(es) which may result from the product failure, and ECO shall not be liable for such costs and expenses.

OTHER THAN HAS BEEN SPECIFICALLY STATED IN THIS WARRANTY, ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING ALL IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED SO FAR AS THE LAW PERMITS.